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ABSTRACTS

from

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(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Action of a Green Fluorescent Substance like Acetyleflavin on Plants and Animals. (Part III).

(pp. 911～913)

By Tetutaro TADOKORO and Keizo ITŌ.
(Hokkaido Imperial University, Received June 13, 1938.)

Feeding Experiments with Rice Proteins.

(pp. 914～922)

By Siro MAEDA, Tuneto HIGASI and Hitosi MATUOKA.
(The Institute of Physical and Chemical Reserch,
Received June 20, 1937.)

On the Content of 0.2 N HCl Soluble Potash in Tyosen Soils. (III).

(pp. 923～941)

By Dr. MISU Hideo.
(Agricultural Experiment Station Government General of Tyosen,
Received Apr. 21, 1938.)

Chemical Researches on the Pulp Woods of Manchoukuo.
Part IV. Chemical Analysis and Cooking Experiment of the Hard Woods.

(pp. 942～950)

By Masuzo SHIKATA and Tsuneo TATSUNO.
(Kyoto Imperial University, Received June 8, 1938.)

In this paper, the researches on the chemical components, fibre-length, and

cooking experiments of hard woods are given.

The species of the woods employed are shown as follows;

Common name	Japanese name	Scientific name	Annual rings
Shui-chui-ryu	Yachidamo	Fraxinus mandshurica Rupr.	97
Howa-chui-ryu	Oh-toneriko	Fraxinus rhynchophylla Hance	62

1. Physical properties.

The distribution of fibre-lengths is as shown in Table I.

Table I. The Distributions of Fibre-length.

Length (mm)	Sui-chui-ryu	Howa-chui ryu
0 ~0.25	——	1.6
0.25~0.50	17.50	18.6
0.50~0.75	28.50	27.6
0.75~1.00	22.25	26.4
1.00~1.25	17.75	18.4
1.25~1.50	10.50	7.0
1.50~1.75	3.25	0.2
1.75~2.00	0.25	——
2.00~2.25	——	——

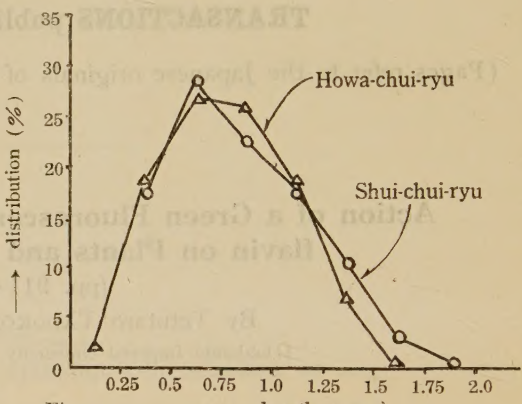

Fig. 1.

The data given in Table I are graphically shown in Figure 1. These data show that the fibre-lengths of these hard woods are not so long as those of soft woods.

2. Chemical analysis of wood components.

The results of analysis of the chemical components of these woods are given in Table II.

Table II. Chemical Components.

Components \ Species	Shui-chui-ryu	Howa-chui-ryu
Ash	0.39	0.22
Water-soluble	3.10	3.99
Hot-water-soluble	4.36	6.60
1% NaOH-soluble	19.93	19.73
Alcohol-benzene-soluble	1.72	3.31
Crude cellulose	55.41	53.62
α-cellulose	40.61	39.09
β-cellulose	8.72	10.01
γ-cellulose	6.08	4.52
Pentosan	20.63	18.45
Lignin	23.02	22.94
In crude cellulose		
α-cellulose	73.29	72.90
β-cellulose	15.74	18.48
γ-cellulose	10.97	8.62
Volume weight	0.57	0.63

3. Cooking experiments.

The cooking experiments with the Ca-sulphite process and soda-process were carried out under the conditions given in Table III.

Table III. The Conditions of Cooking Experiments.

		Soda-process (No. 1)		Ca-sulphite process (No. 2)	Ca-sulphite process (No. 3)
Cooking solution	NaOH	6.45 g/100 cc	CaO	1.0 g/100 cc	1.0 g/100 cc
	Na_2CO_3	0.22	Total SO_2	3.60	3.48
Penetration		110°C 2hrs 2 kg/cm²		110°C 2hrs 3 kg/cm²	110°C 2hrs 5 kg/cm²
Main cooking		165°C 3.5″ 6.5		130°±1°C 3.5″ 5~5.5″	130°±1°C 5″ 6″
Chip (oven dried) / (cooking solution)	Shui-chui-ryu	21.11 g/100 cc		14.07 g/100 cc	14.07 g/100 cc
	Howa-chui-ryu	21.52		14.35	14.35

The chemical components of unbleached pulps are given in Table IV.

Table IV. The Analysis of Unbleached Pulps.

Notation of cooking / Wood / Component	No. 1 pulp		No. 2 pulp		No. 3 pulp	
	Shui-chui-ryu	Howa-chui-ryu	Shui-chui-ryu	Howa-chui-ryu	Shui-chui-ryu	Howa-chui-ryu
Ash	0.99%	0.65%	1.20%	1.13%	0.75%	1.02%
α-cellulose	87.09	89.67	83.33	80.10	86.42	83.93
β-cellulose	9.69	7.88	5.74	5.58	4.16	6.05
γ-cellulose			3.30	3.39	5.60	2.24
Pentosan	17.22	18.00	8.17	5.83	4.66	6.19
Viscosity (centipoises)	26	44	90	88	31	43
Copper number	1.16	1.46	2.13	2.27	1.66	2.14
Roe's number	4.14	4.89	4.62	8.02	1.64	5.69
Yield to chip	42.57%	38.06%	47.29%	45.59%	45.65%	43.72%
Yield to $1m^3$ wood	241 kg	244 kg	268 kg	286 kg	257 kg	274 kg

4. Bleached pulps.

The unbleached soda- and sulphite-pulps of each wood were bleached by the two stages method. After applying chlorine gas about amounting to 75% of theoretical bleachrequirement, which was calculated by "Roe-number", to the 20 g of unbleached air-dried pulps (corresponding to 18.5~18.8 g of absolute dried pulps), they were washed with 0.5% NaOH and water, and steeped in bleaching powder solution of about 0.5% for 1 hour to 4 hours at room-temperature. The chemical components of each bleached pulp are shown in Table V.

Table V. Bleached Pulps

Notation of cooking / Wood / Component	No. 1 pulp		No. 2 pulp		No. 3 pulp	
	Shui-chui-ryu	Howa-chui-ryu	Shui-chui-ryu	Howa-chui-ryu	Shui-chui-ryu	Howa-chui-ryu
α-cellulose	91.91%	90.79%	92.38%	88.17%	90.13%	89.25%
β-cellulose	5.52	6.79	4.55	6.14	5.97	6.7
γ-cellulose	2.57	2.40	3.07	5.69	3.91	4.05
Ash	0.54	0.46	0.25	0.26	0.24	0.36
Pentosan	15.18	14.40	6.79	6.60	5.05	5.34
Viscosity (centipoises)	11.6	8.9	23.5	15.0	9.3	5.3
Copper number	1.76	1.54	1.96	1.67	2.22	2.17
Yield to chip	34.6%	33.60%	41.76%	38.61%	41.97%	36.90%
Yield to 1 m³ wood	195 kg	212 kg	236 kg	243 kg	237 kg	232 kg

Conclusion.

The sulphite pulps (No. 2 and No. 3) showed lower pentosan content than the soda pulp (No. 1).

With respect to the sulphite pulps, No. 3 had in each case (Shui-chui-ryu and Howa-chui-ryu) less pentosan, but larger copper number and lower specific viscosity than No. 2.

No. 1, No. 2 and No. 3 pulps showed the α-cellulose contents varying from 88.2% to 92.4%, and the bleached pulp yield per 1 m³ wood were from 195 kg to 243 kg.

In general the sulphite pulps (No. 2 and No. 3) were superior to the soda pulp (No. 1) with regard to the pulp yields and to the contents of α-cellulose, pentosan and ash.

The pulp wood, Shui-chui-ryu showed higher gravimetric pulp yield than Howa-chui-ryu. However, owing to the higher volume weight of Howa-chui-ryu, this showed the higher pulp yield than Shui-chui-ryu when compared with the same volume of woods.

Studies on the Yeasts found in "Miso."

(pp. 951～988)

By Masatoshi Mogi.

(The Brewing Laboratory of Noda Shōyū Co. Ltd., Noda-machi, Chiba-ken, Japan. Received Apr. 27, 1938.)

The author has isolated 28 new strains of yeast from 44 samples of "Miso" which were produced in various districts of this country. Morphological and physiological properties of the yeasts were investigated in detail and they were accordingly classified as follows: —

Saccharomyces miso α	nov. sp.
〃 〃	var. 1~2 nov. sp., nov. var.
〃 miso β	nov. sp.
〃 〃	var. 1~4 nov. sp., nov. var.
〃 miso γ	nov. sp.
〃 〃	var. 1. nov. sp., nov. var.
Zygosaccharomyces miso α	nov. sp.
〃 〃	var. 1~2 nov. sp., nov. var.
〃 miso β	nov. sp.
〃 〃	var. 1~2 nov. sp., nov. var.
Debaryomyces miso	nov. sp.
〃 〃	var. 1. nov. sp., nov. var.
Hansenula anomala	var. miso nov. var.
Torulopsis miso α	nov. sp.
〃 〃	var. 1. nov. sp., nov. var.
〃 miso β	nov. sp.
〃 〃	var. 1~2 nov. sp., nov. var.
〃 miso γ	nov. sp.
〃 〃	var. 1~2 nov. sp., nov. var.
Torulopsis albida (Saito) Lodder	var. miso nov. var.

The author wishes to express his deep gratitude to Dr. T. Takahashi and Dr. K. Sakaguchi for their kind advice and encouragement throughout this work.

An Improved Method for Estimating in vitro the Digestibility of Fish Meal.

(pp. 989~997)

By Tetuo TOMIYAMA and Saku ISHIKAWA.

(The Imperial Fisheries Institute, Received June 13, 1938.)

In order to shorten the time-interval for the digestion and also to omit such treatments prior to the digestion as grinding it and freeing it from fat, the following improvements of the usual method have been made.

1 g of a sample fish meal* is weighed and transferred to 200 cc Erlenmeyer flask. After being well mixed with 20 cc 0.1 N sodium hydroxide, left at room temperature for 30 minutes. Then, 50 cc 0.1 N HCl and 20 cc of a pepsin solution (containing 4 g Merck's pepsin in 100 cc 0.1 N HCl) are added, being thoroughly mixed. The flask is incubated for 24 hours in a thermostat which is adjusted at 40°. While the incubation, particularly within the first one or two hours, the flask must be shaken several times. After 24 hours' digestion, 10 cc of 30

* If a sample contains such course particles that unable one to make a homogeneous sampling, grind the sample by mortar until it can pass through a 30 mesh wire gauze. It is not necessary to pulverize it into so fine particle as the usual method requires.

per cent trichloracetic acid are mixed and then filtered by dry filter paper. By the determination of total nitrogen made on 25 cc of the filtrate, the digestibility can be calculated by the following formula.

$$D=(n-n')\times\frac{100}{25}\times\frac{100}{N}.$$

where, D: digestibility.
n: amount of nitrogen in a 25 cc filtered digest.
n': amount of nitrogen contained in a 5 cc pepsin solution.
N: amount of nitrogen in 1 g sample fish meal.

A comparative study of the author's method with Wedemeyer's method as well as Oshima's method showed that a meal rather poor in fat (7.5%) gave nearly the same digestibility irrespectively of the methods employed, but that a meal rich in fat (14.3%) gave, by the present method, higher digestibility than by Oshima's or Wedemeyer's method.

The Effect of Heating or Dehydration during the Manufacture of Fish Meal upon its Digestibility.

(pp. 998～1000)

By Tetuo Tomiyama and Saku Ishikawa.
(The Imperial Fisheries Institute, Received June 13, 1938.)

Contrary to the results obtained by Oya and his co-workers, the digestibility of carp meal did not show any change whether the carp muscle was dried at 100°, or at room temperature. Furthermore, the digestibility of the carp muscle coagulated at various temperatures ranging from 70° to 100° was the same as that of the fresh muscle. Only at one hour's digestion, the digestibility of the fresh muscle was found to be a little greater than that of the coagulated one.

Enzymatic Studies on Cereals (Part X.)

On the Separation of Amylases in Rice.

(pp. 1001～1015)

By Gohei Yamagishi.
(Morioka Imperial College of Agriculture and Forestry, Received June 15, 1938).

In the previous papers of this series the auther has maintained that ther are starch-liquefying, starch-dextrifying, and starch-saccharifying enzymes existing independently in rice. It was the purpose of this investigation to prove this by separating these three amylases.

As the sample from which the amylases were prepared, I used the germinated rice, sprouted for about one week at 30°C.

The methods for determining the enzymic activity were essentially the same

as already described in the previous papers.

The results obtained from these experiments may be summarized as follows:

(1) The saccharifying amylase is most sensitive to heat, next the dextrifying amylase, and the liquefying amylase is most thermostable.

It was found that heating the enzyme extract for 5～10 minutes at 80°C was most suitable for the separation of these amylase.

(2) The degree of destruction of the enzyme activity caused by standing for 15 minutes at 5～10°C in different acidities, was most extreme for the liquefying amylase, most slight for the saccharifying amylase, and the dextrifying amylase lay between the two. For the separation of the three amylases, an acidity of about pH 2.5 was most favourable.

(3) Among the enzyme material obtained by the fractional precipitation with 0 to 40, 40 to 50, 50 to 60, 60 to 70, and 70 to 80 percent alcohol, the total amount of enzymes was most abundant in the product of 60～70% fraction, but the enzymic activity of a unite amount was most active in the precipitate produced by bringing the solution from 50 to 60 per cent alcohol by volume.

The fractional precipitation from the aqueous extract with alcohol was not the best means for separating one amylase from another.

(4) Using ammonium sulphate as a precipitant, the product obtained with 20～25% $(NH_4)_2SO_4$ was rich in the liquefying and dextrifying amylase, but 30～35% fraction was rich in the saccharifying amylase. The unit activity was too similar to the total activity.

This method, thereforore, is effective in separating the amyleses.

(5) When the enzyme extract, which was obtained by steeping at a different temperature (0～60°C), was used as a source of enzyme material and treated according to the procedures given above (1～4), by far better results would be obtained; i. e., in order to obtain only the saccharifying amylase, the extraction at lower temperature was most suitable, wheareas to obtain the dextrifying amylase, and especially, the liquefying amylase, the higher temperature (40～50°C) extraction was favourable.

(6) These experimental results supplied a further support to my earlier opinion that there are three kinds of amylases (the starch-splitting, dextrin-forming, and sugar-forming enzymes) in rice.

Studies on Ascorbic Acid (I).

On the distribution of ascorbic acid and glutathion in the animal tissues and organs.

(pp. 1016～1026).

By Kichinosuke Fujimura

(The Institute of Chemical Research, Kyoto Imperial University, Received June 15, 1938.)

By the modification of Wachholder's method (for the estimation of ascorbic acid)

and by Quensel's method (for the estimation of glutathion) these substances, which are distributed in the bodies of hens and carps, were estimated in oxidized and reduced forms.

By these results the relations were made clear between ascorbic acid and glutathion in the animalbody and hence the suggestion of the actions of ascorbic acid on glycolysis.

On the raw Materials of Tannins in Manchoukuo.

(pp. 1027～1036)

By Masuzo SHIKATA and Mitsugi CHIKASUYE.

(Kyoto Imperial University, Received June 8, 1638).

With the aim of estimating the barks of Manchurian trees as the resources of tannins, the following barks were investigated.

Names		Locality
Betula costata, Trantz.	(Chōsen-minebari)	Manchoukuo Kiturin-shô Ikorei
Larix dahurica, Turcz.	(Chōsen-Karamatu)	〃
Phellodendron amurense, Rupr.	(Kibata)	〃
Syringa amurensis, Rupr.	(Mancu-hasidoi)	〃
Juglans manchurica, Max.	(Mancu-gurumi)	〃
Maacki amurensis, Rupr.	(Karainu-enju)	〃
Quercus mongolica, Fisch.	(Mongoli-nara)	〃
Fraxinus rhynchophylla, Hance.	(Ōtoneriko)	〃
Fraxinus manchurica, Rupr.	(Yatidamo)	〃
Acer mono, Max.	(Itayakaede)	〃
Acer mandschuricum, Max.	(Mancu-Kaede)	〃
Acer triflorum, Kom.	(Onimegusuri)	〃
Populus tremula, L. var. Daviniano Scheid.	(Chōsen-yamanarasi)	〃
Populus simoni, Carr.	(Simonidoko)	〃
Tilia amurensis, Kom.	(Amuru-Sinanoki)	〃
Tilia manchurica, Rupr. et Max.	(Mancu-Sinanoki)	〃
Ulmus macrocorpa, Hance.	(Ōnere)	〃
Ulmus laciniata, Major.	(Oi yonire)	〃

The contents of ash, cold water extract, hot water extract, 1% NaOH extract, and alcohol-benzene extract were determined.

For the analysis of tannins, the official methods of the society of Leather Trades' Chemists were applied.

Table I.

	Water		Total solids		Soluble solids		Non-Tannins		Tannins	
	air dry (%)	absolute dry (%)	air dry (%)	abs.dry (%)	air dry (%)	abs.dry (%)	air dry (%)	abs.dry (%)	air dry (%)	abs.dry (%)
Betula costata, Trantz.	12.59	——	4.95	5.66	4.65	5.33	2.46	2.81	2.19	2.52

Larix dahurica, Turcz.	16.06	—	8.30	9.88	7.60	9.05	1.92	2.29	5.68	6.76
Phellodendron amurerse, Rupr.	13.65	—	11.20	12.97	10.20	11.84	7.60	8.80	2.60	3.04
Syringa amurensis, Rupr.	14.68	—	8.7	9.92	8.00	9.59	5.30	6.21	2.70	3.38
Juglans manchurica, Max.	13.57	—	15.30	19.70	9.60	11.22	5.32	6.15	4.28	5.07
Maacki amurensis, Rupr.	14.21	—	13.50	15.73	13.00	15.15	10.31	12.01	2.69	3.14
Quercus mongolica, Fisch.	15.53	—	14.80	17.52	14.60	17.28	5.46	6.46	9.18	10.72
Fraxinus rhynchophylla, Hance.	10.39	—	8.60	9.88	7.60	8.83	6.00	6.97	1.60	1.86
Fraxinus manchurica, Rupr.	15.37	—	9.45	11.17	7.94	9.43	4.80	5.67	3.14	3.76
Acer mono, Max.	15.88	—	5.90	7.01	4.80	5.71	2 20	2.62	2.60	3.09
Acer mandschuricum, Max,	14.47	—	9.00	10.52	8.00	9.35	3.70	4.32	4.30	5.03
Acer triflorum, Kom.	11.13	—	7.60	8.55	6.67	7.51	4.65	5.24	2.02	2.27
Populus tremula, Scheid.	12.24	—	13.90	15.91	13.30	15.06	9.95	11.28	3.34	3.78
Populus simoni, Carr.	13.11	—	4.60	5.24	4.10	4.66	2.10	2.53	2.00	2.13
Tilia amurensis, Kom.	13.35	—	3.40	3.90	2.80	3.21	2.26	2.59	0.54	0.62
Tilia manchurica, Rupr.	12.87	—	3.00	3.44	2.80	3.21	1.10	1.26	1 70	1.95
Ulmus macrocorpa, Hance.	14.31	—	1.70	1.98	1.50	1.76	0.50	0.58	1.00	1.17
Ulmus laciniata, Major.	12.83	—	10.00	11.47	9.20	10.55	4.10	4.70	5.10	5.85

The results of colour reactions are tabulated in Table II.

Table II.

	Colour of extracts.	Gelatine NaCl solution	Ferric chloride solution	Bromine water	Lime water
Betula costata, Trantz.	reddish brown	reddish brown ppted.	blue greenish-black	reddish brown ppted.	no change
Larix dahurica, Turcz.	bright red	〃	blue greenish-black	〃	〃
Phellodendron amurense, Rupr.	yellowish brown	yellowish brown ppted.	greenish brown	yellowish brown ppted.	〃
Syringa manchurica, Max.	reddish brown	〃	light greenish brown	〃	〃
Juglans manchurica, Max.	bright red	〃	blue black	no ppted.	〃
Maacki amurensis, Rupr.	light yellowish brown	〃	light greenish brown	yellowish brown ppted	〃
Quercus mongolica, Fisch.	reddish brown	〃	blue greenish black	〃	〃
Fraxinus rhynchophylla, Hance.	〃	〃	light greenish brown	reddish brown ppted.	〃
Fraxinus manchurica, Rupr.	green-yellowish brown	〃	〃	〃	〃
Acer mono, Max.	yellowish brown	〃	〃	yellowish brown ppted.	〃
Acer mandschuricum, Max.	〃	reddish brown ppted.	〃	〃	〃
Acer triflorum, Kom.	〃	yellowish brown ppted.	〃	reddish brown ppted.	〃
Populus tremula, Scheid.	〃	〃	greenish brown	no ppted.	〃
Populus simoni, Carr.	〃	〃	〃	reddish brown ppted.	〃
Tilia amurensis, Kom.	〃	〃	light greenish brown	〃	〃
Tilia manchurica, Rupr.	〃	〃	〃	〃	〃
Ulmus macrocorpa, Hance.	light yellow	〃	〃	〃	〃
Ulmus laciniata, Major.	bright red	reddish brown ppted.	greenish black	〃	〃

Table II. (*Continued.*)

	Conc. sulphuric acid	Added dil. sulphuric acid and then cold alcohol.		Added lead acetate and then acetic acid.	
		dil. sulphric acid	cold alcohol	lead acetate	acetic acid.
Betura costata, Trantz.	reddish brown ppted.	reddish brown ppted.	soluble	reddish brown ppted.	partly soluble
Larix dahurica, Turcz.	bright red	〃	〃	〃	〃
Phellodendron amurense, Rupr.	yellowish brown	yellowish brown ppted.	〃	yellowish brown ppted.	〃
Syringa amurensis, Rupr.	reddish purple	〃	〃	dark brown ppted.	〃
Juglans manchurica, Max.	reddish brown	reddish brown ppted.	〃	〃	〃
Maacki amurensis, Rupr.	〃	yel owish brown ppted.	〃	light yellow ppted.	〃
Quercus mongolica, Fisch.	reddish purple	reddish brown ppted.	〃	yellowish brown ppted.	〃
Fraxinus rhynchophylla, Hance.	reddish brown	yellowish brown ppted.	〃	〃	〃
Fraxinus manchurica, Rupr.	light red	〃	〃	dark brown ppted.	〃
Acer mono, Max.	yellowish brown	reddish brown ppted.	〃	yellowish brown ppted.	〃
Acer manlschuricum, Max.	〃	〃	〃	reddish brown ppted.	〃
Acer triflorm, Kom.	reddish brown	〃	〃	〃	〃
Poplus tremula, Scheid.	〃	〃	〃	〃	〃
Populus simoni, Carr.	yellowish brown	yellowish brown ppted.	〃	yellowish brown ppted.	〃
Tilia amurensis, Kom.	〃	〃	〃	light brown ppted.	〃
Tilia manchurica, Rupr.	〃	〃	〃	〃	〃
Ulmus macrocorpa, Hance.	〃	〃	〃	〃	〃
Ulmus laciniata, Major.	reddish brown	reddish brown ppted.	〃	reddish brown ppted.	〃

Alcohol Manufacture from Potato. (Part VIII～IX).

On the Alcoholic-Fermentation of Acid-Saccharified Potato Mash (I～II.)

(pp. 1037～1060)

By Hozumi OKADA.

(The Hokkaido Industrial Experiment Station, Received June 21, 1938.)

The author continued the proceeding works on the alcoholic-fermentation of acidsaccharified potato mash. The experimental results are summarized as follows :

(1) The addition of peptone or phosphoric acid salts to the acid-saccharified potato mash does not have any appreciable effect on the yield of alcohol.

(2) Without changing the amount of the acid used and the pressure supplied, the longer the saccharification-time, the more sluggish the fermentation is, and

there is a somewhat lower yield of alcohol.

(3) Brennereihefe Rasse XII, Sacch. formosensis Nakazawa and Sacch. thermantitonum (792) give excellent fermentation results with the acid-saccharified potato mash.

(4) No detectable difference in fermentation can be observed between the acid-saccharified fresh potato-pulp mash and the dried pulp mash.

(5) The fresh potato, only crushed, requires a larger amount of acid for the saccharification compared with the fresh pulp and does not give good fermentation results.

(6) The small amount of un-saccharified carbohydrates in the fermented-mash is easily changed into fermentable sugar by means of the saccharolytic-enzyme of Taka-diastase and therefore it is considered a lower dextrine.

(7) The pressed juice from the crushed potato is rich in the nutritive substances of the yeast. The addition of the pressed juice facilitates the fermentation of the fresh or dried potato pulp mash.

(8) The acclimatization of the yeast to the acid-saccharified potato mash is the most important factor to obtain increased yield of alcoool and to reduce the time of induction-period.

Alcohol Manufacture from Potato. (X).

Seed–Cultures.

(pp. 1061～1071)

By T. YOSIMACHI.

(Hokkaido Industrial Experiment Station, Received July 13, 1938.)

For the fermentation on a semi-industrial scale, 46 Seed-cultures (Shubo) were investigated.

Avoiding any cotamination, the mother yeast (acclimatized Sacch. thermantitonum) was cultivated successively in Pasteur-flask, Carlsberg-fermenter and finally in a Seed-culture- (Shubo-) tank (360 L.).

The possibility of direct application of these seed-cultures (Shubo I) was verified as for the special cases, and they were usually introduccd again to 3 cultures of equal magnitude Shubo II) before the inoculation to 100 H.L. fermentation.

All half-way culture were observed to possess a very wide latitude in their inoculating period. The acid-sugar mash (pH 4.6～5.3, glucose 8.1～11.5%) without any addition of aiding materials resulted in seed-cultres of quite excellent character. As for the fermentation period of Shubo (including both I and II) 40 hrs. may be expeced. The acid-sugar mash derived from raw potato always expelled in its fermentation compared to the mash prepared from the dried material, which was attributable to the presence of pressed juice. Those may be regarded as the characteristic results of this fermentation.

On the Optical Properties of the Fermentation Lactic Acids. (Part. VII).

Effect of the form of nitrogen upon the optical properties of fermentation lactic acids.

(pp. 1072～1074)

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(Agr. Chemical Laboratory, Kyoto Imperial University; Received June 18, 1938).

In our previous paper [Biochem. J. **31**, 909 (1937)], it was ascertained by us that the specificity of the form of lactic acid produced by Leuconostoc mesenteroides var. Sake (*l*–former) and Lactobacillus plantarum sp. (*dl*-former) was a fixed character, whereas very noticeable modifications of the optical properties of the lactic acids were observed with Lactobacillus Sake (*d*–, *dl*– and $dl+d$-formers) where the conditions of fermentation were varied. And it was suggested that this modification of the form of the fermentation lactic acid was due to the amount of Racemiase in the bacterial cells.

In the present paper, report will be made of the experiments which were carried out with four strains of Lactobacillus Sake and one strain of Lactobacillus casei, in order to get a more decisive explanation for the above modification which has hitherto seemed to be a peculiar phenomenon.

As sources of nitrogen, koji extract, bouillon, the mixture of koji extract and bouillon, fresh yeast extract and extract of autolysed yeast were chosen and glucose was employed for the type of sugar.

With extract of autolysed yeast or the mixture of koji extract and bouillon, *dl*–lactic acid was always obtained with all the Lactobacilli, while a large amount of *d*–lactic acid was produced when koji extract, bouillon or fresh yeast extract was employed.

Especially with Lactobacillus Sake No. 42, very remarkable modification was observed as already pointed out in our previous paper.

The amount of Racemiase in the cells of Lactob. Sake No. 42 and 169 cultivated on koji extract or extract of autolysed yeast, was determined with Na–*d*–lactate in the presence of toluence.

Table I. Racemiase in Lactob. Sake.

Bacterial cell			*d*-Lactic acid (g)		Racemization
No.	Cultivated on	Nature	Initial	Residual	
42	Koji extract	*d*–former	1.71	1.83	0
	Autolysed yeast	*dl*– 〃	1.71	0.60	65%
169	Koji extract	*d*– 〃	1.62	1.70	0
	Autolysed yeast	$dl+d(6\%)$–〃	1.67	0.67	60%

Table I shows that the bacterial cells cultivated on koji extract did not reveal any racemization of lactic acid, while very remarkable racemization was observed with the cells obtained from extract of autolysed yeast.

It was further verified that racemization of lactic acid was never observed with the bacterial cells cultivated on koji extract even when extract of autolysed yeast was used instead of water, for the solvent of Na-*d*-lactate.

It is thus ascertained that the modification of the form of the fermentation lactic acid is due to the amount of Racemiase in the bacterial cells, as suggested by us in the previous paper.